

REMARKS

Claims 1-5 are pending. Claim 1 has been amended.

The Examiner has rejected applicant's claims 1-5 under 35 U.S.C. §103(a) as being unpatentable over the Sakamoto (U.S. Pat. No. 5,780,944) patent in view of the Aoshima (U.S. Pat. No. 5,384,506) patent. Applicant has amended applicant's independent claim 1, and with respect to this claim, and its dependent claims, the Examiner's rejection is therefore traversed.

Applicant has amended applicant's independent claim 1 to better define the invention. In particular, independent claim 1 has now been amended to recite a motor comprising a magnet which has a cylindrical shape and is divided into N in the circumferential direction so as to be magnetized to different poles alternately, a rotor shaft which is formed of a soft magnetic material and is fixed in the inside diameter portion of the magnet, a first coil which is adjacent to the rotor shaft and is arranged adjacently to the magnet in the axial direction of the rotor shaft, and a first outside magnetic pole portion which is excited by the first coil, is inserted on the inner periphery side of the first coil and is arranged so as to be opposed to a predetermined angle range of the outer peripheral surface of the magnet with a predetermined gap being provided between the first outside magnetic pole portion and the outer peripheral surface of the magnet. Applicant's independent claim 1 further recites a second coil which is adjacent to the rotor shaft and is arranged on almost the same plane as the first coil so as to be adjacent to the magnet in the axial direction of the rotor shaft, and a second outside magnetic pole portion which is excited by the second coil, is inserted on the inner periphery side of the second coil and is arranged so as to be opposed to a predetermined angle range of the outer peripheral surface of the magnet with a predetermined gap being provided between the second outside magnetic pole portion and the outer peripheral surface of the magnet.

The arrangement recited in applicant's independent claim 1 provides the shortest route for magnetic flux generated by energizing the coil 2, in which the fluxes flow from the first magnetic pole portion 1a, through the magnet 6 and through the rotor shaft 7 formed from the soft magnetic material and then return to the stator 1. As a result, the magnetic flux effectively affects the magnet 6 and the flow path of the magnetic flux has a low magneto-resistance and is therefore efficient in the use of magnetic fluxes. These effects are caused by the arrangement in which the coils 2 and 4 are adjacent to the rotor shaft 7.

The construction recited in applicant's independent claim 1 is not taught or suggested by the cited art of record. More particularly, neither the Sakamoto patent nor the Aoshima patent teach or suggest the first coil being adjacent to the motor shaft and arranged adjacently to the magnet in the axial direction of the rotor shaft or the second coil being adjacent to the rotor shaft and arranged on almost the same plane as the first coil so as to be adjacent to the magnet in the axial direction of the rotor shaft.

Specifically, the Sakamoto patent discloses a rotating machine which includes a magnet formed by a cylindrical back yolk 4 with a plurality of permanent magnets 5 having alternating poles attached to the outer surface of the yolk (FIG. 3A-3B; Col. 5, lines 44-53), a rotating, or rotor, shaft 3 onto which the back yolk is fitted (FIGS. 3A-3B; Col. 5, lines 47-48), and poles 11-1 to 11-4 on which coils 12-1 to 12-4 are wound (FIGS. 3A-3B; Col. 7, lines 37-41). As clearly shown in Figure 3B of the Sakamoto patent, the first coil 12-1 and the second coil 12-3 are not adjacent to the rotor shaft 3.

The term "adjacent" is defined in the dictionary as "to lie near," "to lie akin to," "not distant," or "nearby" (Merriam-Webster's Collegiate Dictionary, 11th Edition). As can be seen in Figure 3B of Sakamoto both the first and second coils are positioned at a significant distance away from the rotor shaft and are not near or adjacent to the rotor shaft. Accordingly, there is

nothing taught or suggested in the Sakamoto patent of the first coil being adjacent to the rotor shaft and of the second coil being adjacent to the rotor shaft. Applicant's independent claim 1, thus patentably distinguishes over the Sakamoto patent.

Moreover, there is nothing added in the Aoshima patent to change this conclusion. Particularly, the Aoshima patent discloses stepper motor including a magnet 41, 42 positioned around a shaft 44, and coils 45, 46 provided on stators 48, 49. (FIGS. 28 and 29; Col. 14, line 58 to Col. 15, line 34). In the arrangement shown in FIG. 29 of the Aoshima reference, most of the magnetic fluxes generated by energizing the coil 45 flow from a magnetic pole portion 48a to a magnetic pole portion 48b and a few of magnetic fluxes pass through the shaft 44 via the magnet 41. This occurs because the magnetic flux has a characteristic of flowing through the shortest route with minimum magneto-resistance. As can clearly be seen in FIG. 29, the coils 45, 46 are separated from the shaft 44 by the magnet portion 42 as well as by a significant distance. The coils 45, 46 in Aoshima are therefore not adjacent to the shaft 44, and applicant's amended independent claim 1 thus patentably distinguishes from the Aoshima patent as well.

Applicant's independent claim 1, which recites the above features, and its respective dependent claims, thus patentably distinguish over the Sakamoto patent and the Aoshima patent and any combinations thereof.

Reconsideration of the claims is respectfully requested. If the Examiner believes an interview would expedite consideration of this Amendment or of the application, a request is made that the Examiner telephone applicant's counsel at (212) 790-9286.

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